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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SHANG, ANNAN Q	

ART UNIT	PAPER NUMBER
2614	

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/823,481	HARP ET AL.	
	Examiner	Art Unit	
	Annan Q Shang	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *06-11-01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-31 rejected under 35 U.S.C. 102(e) as being anticipated by **Shalvi (6,647,070**

As to claim 1, note the **Shalvi** reference figure 1, discloses method and apparatus for combating impulse noise in digital communications channels and further discloses a method comprising:

the claimed "transmitting a first signal including a data signal..." is met by User Unit' Transmitter (User-UT) 101 (fig. 1, col. 4, line 50-col. 5, line 5 and lines 32-42), which transmits a first signal from User-UT 101 "a client" to a Cable Modem Termination System (CMTS) Receiver 103 "a headend" via CATV Channel Link 102 "a transmission channel;"

the claimed "a processing the first signal and produce a second signal including the known sequence of symbols...," "generating a transmission channel model of the transmission channel..." and "applying the known sequence of symbols to an input..." is met by CMTS 103 or Headend which includes Controller Unit (Cont-U) 116 and SDC-

108, IS-109, MF-110, PF-111, AER-112, M-MLSE-D-113 and M-FEC-D-114 (Channel Model 'CH-M' 108-114) (col. 5, lines 43-67 and col. 9, lines 30-54), which monitors the noise conditions of the channel, processes, generates a transmission channel model and apply data symbols of the first signal received from User-UT 101 to produced a second signal including the data symbols, where Cont-U 116 provides parameters to the CH-M 108-114 of CMTS-R 103 utilizing the second signal and further compares an output of Elements 108-114 of CMTS-R 103 and the first signal and dynamically estimate the noise characteristic of the data signal in response to the comparison (col. 9, lines 39-54 and line 57-col. 10, line 26), note that CMTS-Receiver from User--UT 101 via CATV Channel Link 102, a modulated signal with known data symbols (created or deliberately injected) "a known sequence of symbols" and CMTS-Receiver 103 processes the signal with the known data symbols to produce a second signal including the symbols using a multiple symbol time interval.

As to claim 2, Shalvi further discloses where transmitting the first signal from User-UT 101 to CMTS 103 or Headend via the CATV channel link 102 comprises Modulator 106 modulating the signal and the data symbols within User-UT 101 and transmitting the data signal and the inter-symbol substantially simultaneously from User-UT 101 to CMTS 103 via channel link 102 (col. 4, line 50-col. 5, line 7.

As to claim 3, Shalvi further discloses where processing the first signal to produce a second signal includes data symbols comprises Sampler/Down Converter 108 at the CMTS which demodulates the first signal to extract the known data symbols and further applying the known data symbols to an input of SDC-108, IS-109, MF-110,

PF-111, AER-112, M-MLSE-D-113 and M-FEC-D-114 (CH-M 108-114) and Controller 116 of CMTS-R 103 "transmission channel model" comprises applying the extracted known data symbols to CH-M 108-114 (col. 5, lines 38-62 and col. 6, lines 12-43).

As to claim 4, Shalvi further discloses the CMTS 103 processing the first signal to produce a second signal including the known data symbols comprise: storing the known data symbols within a memory of CMTS 103 or Headend, locating a nominal position of the symbols within the signal; correlating the first signal with the symbols utilizing the nominal position; and retrieving the symbols from the memory in response to the correlation and further where applying the symbols to CH-M 108-114 "transmission channel model comprises: applying the symbols to the CH-M 108-114 (col. 5, lines 38-67, col. 7, line 26-col. 8, line 8 and col. 9, lines 30-56).

As to claim 5, Shalvi further disclose where CH-M 108-114 comprises Impulse Smoother 109, Matched Filter 110 and Post Filter 111 "finite impulse response filter" having a plurality of coefficients and generating a CH-M 108-114 of transmission channel independent of a noise characteristic utilizing the second signal comprises calculating a value for each of the plurality of coefficients of Impulse Smoother 109, Matched Filter 110 and Post Filter 111 utilizing a least-squares algorithm (col. 5, line 38-col. 6, line 57 and col. 7, line 43-col. 8, line 20).

As to claim 6, Shalvi further discloses where CMTS or Headend response to comparison comprises estimating an ingress characteristic and a thermal noise characteristic of the data signal (col. 5, lines 32-37, lines50-col. 6, line 18 and col. 7, lines 1-42).

As to claim 7, Shalvi further discloses CH-M 108-114 and C-116 comprises synchronous sampling the first signal relative to a symbol rate of the data symbols and removing a carrier frequency of the first signal to produce a third signal and comparing an output of CH-M 108-114 and C-116 (col. 5, lines 38-67, col. 7, line 43-col. 8, line 20 and col. 9, line 30-56).

As to claims 8-11, Shalvi further discloses reducing the noise characteristic of the data signal utilizing the dynamic estimate (col. 7, line 43-col. 8, line 20 and col. 9, line 30-56), which comprises configuring a filter having a plurality of coefficients; determining a value for each of the plurality of coefficients and modifying the data signal utilizing the filter to reduce the noise characteristic of the data signal, utilizing impulse response of the transmission channel; configuring a decision-feedback equalizer 112 within CMTS 103 or Headend and further modifying the data signal utilizing the filter to reduce the noise characteristic of the signal comprises adaptively filtering the data signal utilizing the decision-feed back equalizer to reduce the noise characteristic of the data signal (col. 5, lines 38-67, col. 7, line 43-col. 8, line 20 and col. 9, line 30-56).

As to claim 12, Shalvi further teaches a method where configuring a filter having a plurality of coefficients comprises: receiving a pre-equalizer architecture parameter via C-116 associated with a pre-equalizer within User-UT 101 and generating a pre-equalizer configuration for the pre-equalizer utilizing the pre-equalizer architecture parameter, and further where modifying the data signal utilizing the filter to reduce the noise characteristic of the data signal comprises imposing distortion on the data signal

utilizing the pre-equalizer prior to transmission to reduce the noise characteristic of the data signal (col. 5, lines 38-67, col. 7, line 43-col. 8, line 20 and col. 9, line 30-56).

As to claim 13, Shalvi inherently teaches determining a value for each of the plurality of coefficients comprises calculating a value for each of the plurality of coefficients utilizing a Wiener-Hopf equation (col. 6, lines 12-35, col. 7, line 43-col. 8, line 20 and col. 9, line 30-56).

As to claim 14, note the **Shalvi** reference figure 1, discloses method and apparatus for combating impulse noise in digital communications channels and further discloses a system comprising:

The claimed "a client..." is met by User-Unit Transmitter (User-UT) 101 (fig. 1, col. 4, line 50-col. 5, line 5 and lines 32-42), which transmits a firsts signal including a data signal via CATV Channel Link 102 "a transmission channel," where User-UT 101 includes a Modulator 106 which modulates data signal and known data symbols "a known sequence of symbols" and transmits the modulated data signal and the symbols substantially simultaneously via CATV Link 102;

The claimed "a headend..." is met by Cable Modem Termination System (CMTS) Receiver (R) 103 (col. 4, lines 59-61 and col. 5, lines 32-67), note that CMTS-Receiver, a headend, receives the first signal from User-UT 101 via CATV channel Link 102 and dynamically estimates a noise characteristics using various components at the CMTS-Receiver 103, which includes:

the claimed "a transmission channel model of the transmission channel" is met by SDC-108, IS-109, MF-110, PF-111, AER-112, M-MLSE-D-113 and M-FEC-D-114

(Channel Model 'CH-M' 108-114) and Cont-U 116 of CMTS-R 103 "a transmission channel model" of a CATV Link 102 channel independent of the noise characteristic to receive inter-symbol interference;

the claimed "a processor to process the first signal and produce a second signal including the known sequence of symbols..." and "a comparator to compare an output of the transmission channel model and the first signal and dynamically estimate the noise characteristic..." is met by CH-M 108-114 and Cont-U 116 (col. 5, lines 43-67 and col. 9, lines 30-54), which monitors the noise conditions of the channel, processes the first signal received from User-UT 101 to produced a second signal including the inter-symbol interferences and provide the symbols to the CH-M 108-114 of CMTS-R 103 utilizing the second signal and further compares an output of Elements 108-114 of CMTS-R 103 and the first signal and dynamically estimate the noise characteristic of the data signal in response to the comparison (col. 9, lines 39-54 and line 57-col. 10, line 26).

Claim 15 is met as previously discussed with respect to claim 6.

Claim 16 is met as previously discussed with respect to claim 5.

Claim 17 is met as previously discussed with respect to claim 3.

Claim 18 is met as previously discussed with respect to claim 4.

Claim 19 is met as previously discussed with respect to claim 8.

Claim 20 is met as previously discussed with respect to claim 5.

Claim 21 is met as previously discussed with respect to claim 10.

Claim 22 is met as previously discussed with respect to claim 11.

Claim 23 is met as previously discussed with respect to claim 12.

Claim 24 is met as previously discussed with respect to claim 12.

As to claim 25, note the **Shalvi** reference figure 1, discloses method and apparatus for combating impulse noise in digital communications channels and further discloses a headend comprising:

the claimed "a receiver..." is inherent to Cable Modem Termination System (CMTS) Receiver (R) 103 (col. 4, lines 59-61 and col. 5, lines 32-67), which receives the first signal from User Unit Transmitter (User-UT) 101 via CATV channel Link 102 and dynamically estimates a noise characteristics using various components at the CMTS-Receiver 103, which

the claimed "a transmission channel model of the transmission channel" is met by SDC-108, IS-109, MF-110, PF-111, AER-112, M-MLSE-D-113 and M-FEC-D-114 (Channel Model 'CH-M' 108-114) and Cont-U 116 of CMTS-R 103 "a transmission channel model" of a CATV Link 102 channel independent of the noise characteristic to receive know data symbols;

the claimed "a processor to process the first signal and produce a second signal including the known sequence of symbols..." and "a comparator to compare an output of the transmission channel model and the first signal and dynamically estimate the noise characteristic..." is met by CH-M 108-114 and Controller Unit (Cont-U) 116 (col. 9, lines 30-54), which monitors the noise conditions of the channel, processes the first signal received from User-UT 101 to produced a second signal including the inter-symbol interferences and provide the inter-symbol interference to the Elements 108-114

of CMTS-R 103 utilizing the second signal and further compares an output of Elements 108-114 of CMTS-R 103 and the first signal and dynamically estimate the noise characteristic of the data signal in response to the comparison (col. 9, lines 39-54 and line 57-col. 10, line 26).

Claim 26 is met as previously discussed with respect to claim 6.

Claim 27 is met as previously discussed with respect to claim 5.

Claim 28 is met as previously discussed with respect to claim 12.

As to claim 29, note the **Shalvi** reference figure 1, discloses method and apparatus for combating impulse noise in digital communications channels and further discloses a ma headend comprising:

the claimed "receiving a first signal including a data signal via a transmission channel..." and "processing the first signal to produces a second..." is met by Cable Modem Termination System (CMTS) Receiver (R) 103 (col. 4, lines 59-61 and col. 5, lines 32-67), which receives the first signal including a data signal from User Unit Transmitter (User-UT) 101 via CATV channel Link 102, processes the first signal to produced a second signal including known data symbols "known sequence of symbols" and generates a transmission channel model of the transmission channel independent of a noise characteristics utilizing the second signal (col. 5, lines 32-67);

CMTS 103 utilizes SDC-108, IS-109, MF-110, PF-111, AER-112, M-MLSE-D-113 and M-FEC-D-114 (Elements 108-114) of CMTS-R 103 applies the known sequence of symbols to the transmission channel model, compares an output of the transmission channel model to the first signal and where Controller Unit (Cont-U) 116 (col. 9, lines

30-54) monitors the noise conditions of the channel, processes the first signal received from User-UT 101 to produced a second signal including the symbols and provide the symbols to the Elements 108-114 of CMTS-R 103 utilizing the second signal and further compares an output of Elements 108-114 of CMTS-R 103 and the first signal and dynamically estimate the noise characteristic of the data signal in response to the comparison (col. 9, lines 39-54 and line 57-col. 10, line 26).

Claim 30 is met as previously discussed with respect to claim 6.

Claim 31 is met as previously discussed with respect to claim 8.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Quigley et al (2001/0055319) disclose robust techniques for optimal upstream communication between cable modem subscribers and a headend.

Segal et al (6,647,069) method and apparatus for capacity increase and enhanced communications performance in CATV networks.

Roeck et al (6,574,796) disclose fast and reliable data carrier detection by a cable modem in cable television plant.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Annan Q. Shang** whose telephone number is **571-272-7355**. The examiner can normally be reached on **700am-500pm**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **John W. Miller** can be reached on **571-272-7353**. The fax phone number for the organization where this application or proceeding is assigned is **703-872-9306**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the **Electronic Business Center (EBC) at 866-217-9197 (toll-free).**

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